

Appl. No. 10/663,717  
Office Action mailed September 1, 2005  
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**Amendments to the specification:**

Please substitute the indicated numbered paragraphs for the same-numbered paragraphs in the application. In addition, two unnumbered headings have been amended. No new matter has been added to the specification.

[0003] Commercial deep fat frying units are required to process large quantities of, for example, batter coated chicken or fish, or french fries. In such operations ~~then~~ when food particles, batter, and the like fall off the food being cooked and if such debris remains in the cooking oil ~~it~~ the debris will affect the taste of the food being cooked.

[0005] In some prior art fryers, a sump is provided below heat tubes which extend through the oil bath. Food is cooked above the heat tubes and dislodged particles and debris accumulate in the sump below. The sump area below the heat tube then is at a lower temperature than the cooking bath and unacceptable flavors can develop from the ~~ever-cooked~~ over-cooked food particles in the sump.

Between paragraph [0006] and paragraph [0007]:  
~~SUMMARY OF THE INVENTION~~

[0008] In operation, the oil will flow downwardly into a filter, pass through the filter, and then be pumped from the bottom of the pan so that the food particles will be left as a cake on top of the filter which is horizontally disposed within the filter pan. Cleaning is then simplified by lifting the filter out of the pan to dump the waste food ~~particle~~ particles into a waste container for disposal.

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[0009] Of the several improved features of embodiments of the instant invention which increase the simplicity and efficiency of the operation, a filter pick up tube which connects the filter and a pump to return filtered oil to the fryer is provided, and an inline strainer is disposed within the tube in order to eliminate any debris in the oil to be returned to the tank. The filter pick up tube is also received in a U-shaped guide bracket which holds the tube in position, but allows the pick up tube assembly and filter to float upward and downward as the tube is slidably received within the U-shaped bracket.

[0010] It is desirable to use filtered oil from time to time to wash down the sides of the tank. ~~It is essential, however, during~~ During this operation, ~~that the oil should be only~~ minimally aerated as aerated oil will break down faster requiring more frequently replacement. A filter polish tube is provided, and in addition, an oil return spigot is also provided. In the case of the latter, the spigot is adjacent the flue pipe and therefore it is preferably double walled. The spigot is used to empty a minimal amount of oil pumped from the filter pan into a separate pan which is then used to rinse down the sides of the tank.

[0013] ~~Accordingly it is an object of this invention to~~ embodiments may provide an improved filter system for a deep fat fryer wherein an inline filter is provided in the oil return from the filter sump.

[0014] ~~It is a further object of this invention to~~ Embodiments may also provide a stabilizing bracket for the drain spigot so that it will be stabilized in the drain position and can be rotated into a vertical position when not in use.

[0015] ~~It is a further object of this invention to~~ Embodiments may also provide a guide bracket for slidably receiving the filter pick up tube which allow the filter assembly to ride up and down floating with the oil filtered.

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[0016] ~~It is a further object of this invention to~~ Embodiments may also provide an oil return spigot for removal of small quantities of filtered oil in a separate pan for use in rinsing the sides of the tank.

[0017] ~~It is yet another object to~~ Some embodiments may provide a curved downspout, separate crumb tray, and baffle which will admit oil to be filtered in a uniform flow across the filter media to avoid displacement of filter aids located on the upper surface of the filter media itself so that the filter aids will not be washed away from the filter media by a direct discharge on to the surface of the oil to be filtered from the tank.

[0018] ~~It is still another object of this invention~~ Some embodiments may provide a closed circuit for polishing the oil whereby oil can be pumped from the filter pan, and returned directly to the upper surface of the filter repeatedly without aerating the oil.

[0019] These and other ~~objects~~ advantages will become readily apparent with reference to the drawings and following description wherein:

Between paragraph [0029] and paragraph [0030]:

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS OF THE INVENTION

[0030] As described in the above identified related patent, and as shown in Fig. 10 herein, a commercial deep fat fryer 121 has an open fry tank 123 with heat tubes 125 running therethrough as a source of heat for the cooking oil. Periodically the tank is drained by gravity into a filter pan 18 beneath the tank 123 and filtered. The filtered oil then is returned to the tank for reuse. While the tank typically drains by gravity, the filtered oil will be pumped back into the tank. One or a plurality of tanks can use the same filter pan so that oil in the tanks can be drained sequentially, filtered and returned.

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[0031] Periodically the filter pan must be emptied as repeated use will cause the oil to break down and leave undesirable tastes in the food to be cooked. In the preferred embodiment of this invention, the filter pan has casters or wheels typically on one end and a handle on the opposite end so that an operator can withdraw the filter pan and wheel it to a disposal site.

[0032] With attention to FIGS. 1 and 2, a rotatable, curved downspout 10 is used to drain oil into a filter pan as will be subsequently explained. In the raised horizontal position shown in FIG. 1, the filter pan (not shown) can be rolled out from beneath the fryer for cleaning or disposal of waste oil. The downspout 10 in FIG. 2 is shown rotated to an extreme up position to allow downspout removal to clear a blockage. Downspout 10 is slidably mounted on conduit 11 to facilitate this removal, manually, without tools. In order to rotate the downspout 10, a handle 12 is provided and as are a pair of opposed clips 14 which are intended to engage the polishing tube 16 when the downspout 10 is in the lower position and in the horizontal position of FIG. 1. Retainer clips 14 disengage from tube 16 when the downspout is rotated or switched to the position of FIG. 2 so that the downspout 10 can be removed to clear a blockage.

[0033] With attention to FIGS. 3 and 4, the filter pan 18 has an oil return pipe 20 which slidably engages a coupling 22 shown in FIGS. 1 and 2. Coupling 22 then is mounted at the end of the pipe (not shown) which is controlled by a pump (not shown) and filtered oil is returned through the pipe 20 and the remote pump to the cooking tank 123. See FIG. 10. Coupling 22 is a floating member not fixed to the chassis of the fryer for flexibility. An inline filter 24 is provided in the return pipe 20 and it is maintained within the pipe 20 by a threaded knob 26 so that it can be manually removed as shown in FIG. 4, periodically, for cleaning. The return pipe 20 is also supported by a U-shaped guide bracket 28. Return pipe 20 is slidably received in the U-shaped bracket 28 so that the pipe 20 can rise and fall as the filter is used, as will be subsequently explained.

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[0035] As will be apparent to those skilled in the art, it is necessary to avoid an uneven buildup of filter cake on the filter. In prior art filter pans the oil to be filtered will be discharged directly onto the upper surface of the filter as ~~[[it]]~~ the oil flows by gravity through a vertical downspout. The hot oil can then splash, and more particularly will clear away the filter aid material disposed on the upper surface of the filter paper or cloth. When such an area has been cleared of filter aid, the resistance to flow through the filter in that area will be greatly reduced and therefore the pump will draw the oil to be filtered through such cleared area, selectively, thereby eliminating the beneficial effects of a filter aid material. Downspout 10 is curved so that oil will not directly impact the filter. Such a direct impact could sweep away both accumulated cake and the filtering aid material, ~~and the~~ The rounded pipe also would minimize the chance of splashing.

[0036] As also shown in ~~FIG. 8~~ FIGS. 8-9, a separate crumb tray 60 is provided in space 61 adjacent the filter 32. Oil from the downspout 10, which registers in the down position on tray 60, then flows directly into this crumb tray 60. The sides of the tray 62 are sufficiently vertically dimensioned by baffle 64 to insure that the oil to be filtered must pass above the sides in order to reach the filter thereby minimizing splashing and insure a more uniform flow onto the surface of filter 32. With the exception of baffle 64 the sides and bottom of tray 60 are primarily mesh.

[0038] The polishing operation according to embodiments of this invention has been found to drastically increase the life of the oil as follows:

[0040] ~~According to~~ In embodiments of the present invention, however, the polish tube 16 is preferably submerged within the oil to be filtered in the filter pan. When it is desired to polish, handle 17 is used to operate a by pass valve to tank the return so that oil is pumped in a closed circuit from the filter pan through conduit 20, and returned directly to the filter pan through the polishing tube 16. When it is desired to return to

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cooking operation the handle 17 is then deactivated so that the oil from conduit 20 is returned directly to the tank without recycling further. Handle 17 thus acts as a manual switch to operate the by pass valve. Polishing according to this process twice daily for about one half hour has been found to dramatically lengthen the cooking time on a batch of oil.

[0041] Finally, as shown in FIG. 10, the fryer 121 which may have a lifting mechanism 44 for baskets 45, and may be equipped with a spigot 46 at one end of a pipe 48. The opposite end 50 of pipe 48 will be coupled to the pump ~~(not shown)~~ 47 so that a small quantity of oil from the filter pan 18 can be diverted to the tank where it can be used to wash down the sides of the tank with a bucket or other container (not shown). Coupling 22 returns oil to pump 47 with piping 43.

[0042] In summary then the improvements in the filter system ~~of this invention~~ include a support clip for the rotatable downspout and a U-shaped support for the return pipe. ~~The invention further includes~~ Embodiments may also include an inline filter which is removable and is disposed in the return line which returns the filtered oil to the cooking tank in order to ensure any particles which remain in the filtered oil will not be returned to the tank.

[0043] The improvements in the filter system ~~of this invention~~ further include a closed polishing circuit wherein filtered oil can be refiltered without aeration and without first passing through the cooking tank.

[0045] ~~It will be readily seen by one of ordinary skill in the art that the present invention fulfills all of the objects set forth above.~~ After reading the foregoing specification, one of ordinary skill will be able to effect various changes, substitutions or equivalents and various other aspects of the invention as broadly disclosed herein. It is therefore intended that the protection granted hereon be limited only by the definition contained in the appended claims and equivalents thereof.